CLAIMS

What is claimed:

1. A particle separator device using a laser beam coupled to a fluid pathway for interaction with particles comprising:

a fluid pathway containing colloidal particles;

a laser beam directed into said fluid pathway incident on said particles, whereby said laser power is varied to control the position of said particles for separation based upon refractive index.

2. The particle separator of claim 1, whereby particles are separated based on chemical composition.

3. The particle separator of claim 1, said fluid pathway further including a glass fluidic device that facilitates optical alignment of a fluid pathway with a laser beam for optically separating particles.

4. The particle separator of claim 3, said fluidic device further comprising a glass window to improve optical coupling between laser beam and fluid.

5. The particle separator claim 1, whereby vertical alignment is facilitated through a flow cell design which permits visual access to the fluid and laser beam pathway.

6. The particle separator of claim 1, said fluid pathway further comprising inlet and outlet reservoirs and an optical interface using a glass windows sandwiched between walls, forming a liquid tight seal and an optically clear interface for the laser beam to enter the flowcell.

7. The particle separator of claim 1, further comprising a lens for optically manipulating the laser beam by using the linear lens translator offering a finer degree of particle control.

8. The particle separator of claim 1, further comprising a periscope mirror assembly for maintaining laser beam position inside the flowcell permitting optical separation of particles while collecting image data.

9. The particle separator of claim 8, said periscope mirror further comprising one mirror mounted to the optical bench and the other, attached to the microscope so that the stage moves up and down allowing focusing while the beam is at a constant height in the flowcell.

10. An optical separation method using a particle separator laser comprising the steps for:

propelling particles and fluid into a flow cell at high velocity,

directing a laser beam at said flow cell incident to said particles and imparting photon momentum to said particles;

separating the particles on the basis of their interaction with the laser beam;

increasing laser power to trap particles,

decreasing flow speed to retain said particles and achieve flow stability for subsequent optical separation of trapped colloidal materials.